Water Quality Monitoring and Assessment: Perspectives in State Tribal Training

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THE MANY FACES OF OKLAHOMA GOVERNMENT WATER PROTECTION

SECRETARY OF ENVIRONMENT
Administrative Lead (EPA Grants)

CONSERVATION COMM.
Tech. Lead 319 Program (NPS), Wetlands, Env. Ed Coord.,

DEQ
NPDES (PS), 401 (state cert.), TMDLs, superfund,

WATER BOARD
Water Quality Standards, Clean Water Revolving Fund, Tech. Lead 314 (Clean Lakes), BUMP

CORP. COMM.
Oil and Gas pollution; tanks

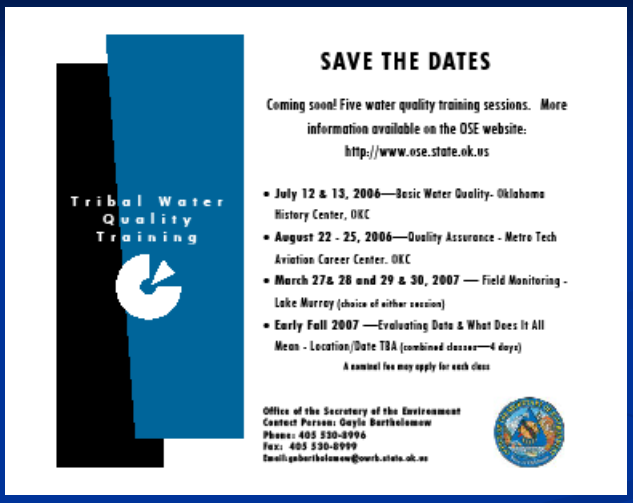
ODAFF
CAFOs, Silivculture NPS, pesticides

TRIBAL WATER PROTECTION

•Sovereign tribal nations have the right (and are encouraged) to develop their own standards and water quality programs.

•To this end, EPA and state agencies work cooperatively to provide opportunities to build environmental program capacity with participating tribal authorities.

From USEPA website



In cooperation with EPA Region 6, Oklahoma has and continues to offer training and support to tribes in development of their WQ monitoring and assessment programs

2006 TRAINING: CLASS I

The first of this series of workshops is:

Class I—Basic Water Quality

July 12 & 13, 2006
The Oklahoma History Center
2401 North Laird
Oklahoma City, OK.
http://www.oklahomahistorycenter.org/

This is a basic water quality course ideal for those that have a limited background in biological/environmental sciences. It will provide an understanding of watersheds; an introduction to pollutants; and an overview of stream, lake, reservoir, groundwater, and wetland health.

The first class offered in the 2006 training provided an opportunity for exposure to foundational principals in water quality management.

2006 TRAINING: CLASS I TOPICS:

- Watershed Principles
- Pollution basics
- Stream and lake health concepts
- Groundwater quality
- Wetlands primer

2006 TRAINING: CLASS II

EPA REGION 6 QUALITY ASSURANCE
DALLAS, TEXAS

ORIENTATION TO QA MANAGEMENT and

DATA QUALITY OBJECTIVES COURSE

DESCRIPTION: This two-day workshop serves as an orientation to the basic management issues associated with EPA's Quality Assurance Management Program and introduces participants to the Data Quality Objectives concept and process. It will provide participants with a systematic non-technical introduction to the primary elements and concepts of quality assurance. In Data Quality Objectives the emphasis is on environmental project management issues associated with DQO's rather than on detailed "how-to" technical information.

For the second class, EPA Region 6 staff provided quality assurance and DQO training necessary to develop monitoring programs that qualify for CWA funding.

2006 TRAINING: CLASS III

The next in this series of workshops is:

Class 3—Water Quality Monitoring of Watersheds

March 27 & 28 or March 29 & 30, 2007*
Lake Murray Resort Park
2 miles east of I-35 at exit 24
Ardmore, OK. 73401
*Two back to back identical courses, chose one

This is a how-to course focusing on chemical and biological monitoring of water quality. Only a small portion of the training will be conducted in the classroom—the majority of the training will be conducted in or at the water's edge. All participants are expected to participate and should be prepared for any type of weather. Please bring appropriate clothing, rain gear, sunscreen, insect repellant and life jackets if you have one.

The third class provided a hands on, field oriented experience in critical aspects of water quality monitoring.

CLASS III TOPICS AND HIGHLIGHTS

- Why monitor?
- Choosing sampling locations
- Equipment basics
- Sampling technique demonstrations
- Quality Assurance

WHY MONITOR - DQOs

- Monitoring is necessary to assess waterbody health and attainment of WQS, document trends, and assess effectiveness of implementation projects
- Monitoring design depends on goals and may comprise fixed station networks (BUMP and Rotating Basin), intensive surveys (OCC-Little Deep Fork Project), or probabilistic surveys (EMAP or WSA)
- Data is generated allowing assessment of waterbody to determine if BUs are being met or projects are successful in abating pollution

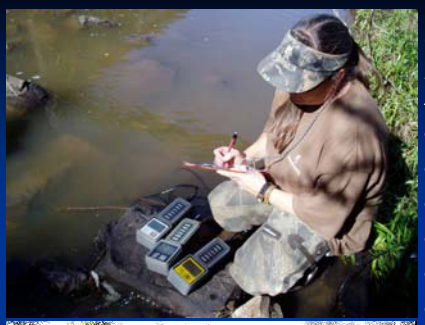
MONITORING PROGRAM DEVELOPMENT

- Define objectives (e.g., assess status/trends; assess effects of projects)
- Assess data needs to accomplish objectives (in light of funding available)
- Determine sample design (fixed station, probabilistic) and implement
- Interpret data and report findings

From USEPA website

OVERARCHING GOAL: DETERMINE STREAM HEALTH

WATER QUALITY



COMMON SITE MEASUREMENTS:

- Discharge
- Temperature
- Dissolved oxygen
- pH
- Conductivity
- Turbidity
- Alkalinity
- Assorted site observations

COMMON ANALYTES OF WQ SAMPLES:

- Total P
- ortho-P
- Ammonia
- Nitrite-N
- Nitrate-N
- Total Kjeldahl Nitrogen
- CBOD-5
- Chloride
- Sulfate
- Total Dissolved Solids
- Hardness
- Total Suspended Solids
- Other parameters – metals, pesticides, PPCPs

BIOTIC QUALITY

Fish

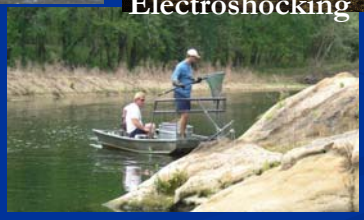
Bugs

Plants

FISH COLLECTION

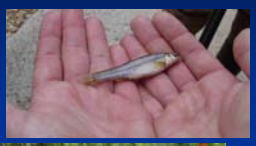
Seining

Electroshocking



FISH IDENTIFICATION

The Oklahoma Conservation Commission conducts an annual fish identification training focusing on collection techniques and field identification of fish species.



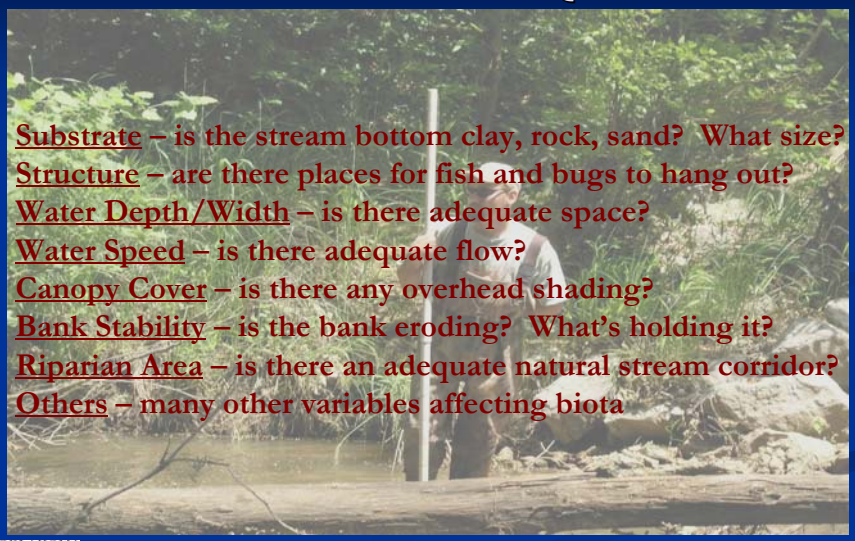
BUG COLLECTION


Kicknet sampling


Vegetation sampling


Picking

PHYSICAL HABITAT QUALITY



Substrate – is the stream bottom clay, rock, sand? What size?
Structure – are there places for fish and bugs to hang out?
Water Depth/Width – is there adequate space?
Water Speed – is there adequate flow?
Canopy Cover – is there any overhead shading?
Bank Stability – is the bank eroding? What's holding it?
Riparian Area – is there an adequate natural stream corridor?
Others – many other variables affecting biota

HABITAT DATA COLLECTION

DATA ANALYSIS

- Monitoring data is necessary, but without effective analysis, not of much value
- Tribal training events include a unit on data analysis with demonstration (planned for later 2007)
- Water quality data may be **summarized and conveyed** in an effective manner using a couple basic statistics and graphic presentations
- Holistic stream evaluations include analysis of biological communities using EPA Rapid Bioassessment Protocols (RBP) or similar methods. May be downloaded at the following URL:

  http://www.epa.gov/owow/monitoring/rbp/wp61pdf/rbp.pdf

REPORTING

- EPA requires biennial summarization of state monitoring and BU assessment results (two reports)
  - 305(b) – inventory of all waterbodies and their condition
  - 303(d) – list of threatened or impaired waters
- Starting 2002, allowed to submit this info in a consolidated format (Integrated Report)
- All credible and quality assured data is viable for submission and assessment

BU ASSESSMENT

- Reporting cycle – biennial analysis of five year window of applicable data (e.g., 2004 IR = 9/1/98-9/1/03)
- Data are queried and quality assured for out-of-range errors and erroneous results
- Data are subjected to assessment via Integrated WQ Report Listing Methodology (found in the state's Continuing Planning Process via DEQ at http://www.deq.state.ok.us/WQDnew/pubs/2002_cpp_final.pdf

BU ASSESSMENT -cont-

- Minimum data requirements for all parameters ensuring adequate spatial and temporal representation
- For most parameters – 10 samples minimum, covering seasons and years
- Assessments can only represent 10 miles upstream of wadeable stream sites and 25 miles for nonwadeable rivers

BUs ASSESSED BY PARAMETER: EXAMPLE

To assess if a stream is attaining the fish and wildlife propagation beneficial use for pH:

- 10 samples minimum to make an attainment determination.
- The F&WP beneficial use is considered *attained with respect to pH* if 10% or fewer of the samples fall outside the screening range of 6.5 (minimum) and 9.0 (maximum).
- The F&WP beneficial use is considered *not attained with respect to pH* if more than 10% of the samples fall outside the screening range of 6.5 (minimum) and 9.0 (maximum).

INTEGRATED REPORT

- 305(b) and 303(d) combined
- Lists beneficial use attainment status and places in an attainment category
- For waterbodies not attaining (303(d) list), lists causes and sources of pollution
- Lists remediational activities prescribed (TMDL) and timeline for implementation
- Updated every two years. Next cycle for release is 2008.